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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/736,679	12/17/2003	Hideko Inoue	740756-2689	4095

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EXAMINER

YAMNITZKY, MARIE ROSE

ART UNIT PAPER NUMBER

1774

DATE MAILED: 08/30/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/736,679

Applicant(s)

INOUE ET AL.

Examiner

Marie R. Yamnitzky

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 30 June 2006.  
2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.  
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-3 and 11-42 is/are pending in the application.  
4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.  
5) ☒ Claim(s) 23-32 is/are allowed.  
6) ☒ Claim(s) 1-3, 11-22 and 33-42 is/are rejected.  
7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.  
8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.  
10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)  
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)  
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.  
4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_.  
5) ☐ Notice of Informal Patent Application (PTO-152)  
6) ☐ Other: \_\_\_\_\_.

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1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's amendment filed on June 15, 2006, which amends claims 1, 11 and 17, and adds claims 23-42, has been entered.

Claims 1-3 and 11-42 are pending.

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

2. Claims 34-37 and 39-42 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 34-37 and 39-42 are drawn to the organometallic complex according to a previous claim, but each of these claims depends directly or ultimately from a claim drawn to a light emitting device. Correction of the preamble of claims 34-37 and 39-42 is required.

3. Claims 1-3, 11-16, 33, 34, 38 and 39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Thompson et al. (US 2002/0034656 A1) in view of *Grant & Hackh's Chemical Dictionary* 5<sup>th</sup> ed. (1987), page 53.

See the entire published application of Thompson et al. In particular, see Fig. 11, Fig. 49, paragraphs [0052], [0058]-[0059], [0169]-[0173], [0177]-[0180] and [0183]. Thompson et al. suggest iridium compounds of general formula 2 as defined in present claim 1, and further defined in present claims 2 and 3.

With respect to present claims 11-16, Thompson et al. disclose the iridium compounds for use as a light emitter in an organic light emitting device (OLED) having the structure set forth in independent claim 11.

Further with respect to claim 14, the OLED may be incorporated into various articles as taught, e.g., in paragraph [0051].

Further with respect to claims 15 and 16, Thompson et al. teach that a hole-transporting layer may be included in the device structure, and may be made of known hole-transporting materials. The material represented by the formula in paragraph [0177] meets the limitations of a low molecular weight material as required by claim 16. Polyvinylcarbazoles, which are taught in paragraph [0180] as hole-transporting and are known in the art as suitable for hole transporting layers, meet the limitations of a polymer material as required by claim 15. A hole transporting layer made of the material represented by the formula in paragraph [0177] or made of a polyvinylcarbazole will inherently provide a hole injection function.

Thompson et al. disclose compounds of formula  $L_2MX$  where L may be a phenylimine, and X may be monoanionic ligand such as acetylacetonate (a ligand of present formula 3), picolinate (a ligand of present formula 5), salicylanilide (a ligand similar to the ligand of present

formula 7, differing only in having  $=NCH_3$  instead of  $=NH$ ), salicylaldehyde (a ligand of present formula 8), or 8-hydroxyquinolate (a ligand of present formula 9).

Thompson et al. do not disclose a specific example of a compound within the scope of the present claims, but such compounds are clearly suggested by Thompson's disclosure. It would have been *prima facie* obvious to one of ordinary skill in the art at the time of the invention to make compounds of formula  $L_2MX$  utilizing the L and X ligands taught by Thompson et al. in order to provide a variety of compounds suitable for use in an EL device as taught by the prior art. One of ordinary skill in the art at the time of the invention would have reasonably expected that iridium compounds of formula  $L_2MX$  having the L and X ligands taught by Thompson et al. would be luminescent materials and would be suitable for use in the luminescent layer of an organic EL device.

In the phenylimine formula shown in Thompson's Fig. 49, R corresponds to present  $R_1$ , and R' corresponds to present  $R_3$ - $R_6$ . Thompson et al. do not explicitly define R and R' for the phenylimine formula shown in Fig. 49 but, based on Thompson's disclosure as a whole and paragraphs [0169]-[0173] in particular, one of ordinary skill in the art at the time of the invention would have reasonably expected at least alkyl and aryl groups to be suitable substituents since Thompson et al. disclose alkyl and aryl substituents as suitable for other luminescent compounds within Thompson's disclosure. Further, the phenylimine formula shown in Thompson's Fig. 49 does not show a substituent at the position corresponding to present  $R_2$  but, based on paragraphs [0172]-[0173] in particular, one of ordinary skill in the art at the time of the invention would

have reasonably expected that phenylimine ligands having an alkyl or aryl group at this position instead of hydrogen could be used to make Thompson's compounds of formula  $L_2MX$ .

The rejected claims require  $R_1$  to be a phenyl group. A phenyl group is an aryl group. As noted above, based on Thompson's disclosure as a whole and paragraphs [0169]-[0173] in particular, one of ordinary skill in the art at the time of the invention would have reasonably expected an aryl group to be a suitable substituent at the position corresponding to present  $R_1$ . With respect to the selection of a phenyl group as the aryl group, it is the examiner's position that one of ordinary skill in the art at the time of the invention would have at once envisaged a phenyl group from Thompson's teaching of an aryl group since a phenyl group is a basic aryl group. For example, see the definition of "aryl" as set forth on page 53 in *Grant & Hackh's Chemical Dictionary*.

With respect to present claims 33, 34, 38 and 39, compounds suggested by Thompson et al. that are within the scope of organometallic complexes of present general formula 2 will inherently have the emission characteristics of those complexes.

4. Claims 17-22, 35 and 40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Thompson et al. (US 2002/0034656 A1) in view of *Grant & Hackh's Chemical Dictionary* 5<sup>th</sup> ed. (1987), page 53, as applied to claims 1-3, 11-16, 33, 34, 38 and 39 above, and further in view of Yamazaki et al. (US 2001/0050373 A1) or Kamatani et al. (US 2003/0059646 A1).

Thompson et al. teach that the OLED may be incorporated into various articles as taught, e.g., in paragraph [0051]. Thompson et al. do not explicitly disclose the structure required for

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the device of independent claim 17 and claims dependent therefrom, which includes a thin film transistor (TFT), an interlayer insulating film over the TFT, and first electrode over the interlayer insulating film and electrically connected to the TFT.

A light emitting display device comprising an EL device electrically connected to a TFT through an insulating film was known in the art at the time of the invention.

Yamazaki et al. and Kamatani et al. disclose active matrix light emitting display devices comprising an EL device (OLED) having an electrode electrically connected to a TFT through an interlayer insulating film. In Yamazaki's published application, see Fig. 15 and paragraphs [0126]-[0135], for example. In Kamatani's published application, see Fig. 6 and paragraphs [0201]-[0206], for example.

It would have been an obvious modification to one of ordinary skill in the art at the time of the invention to use Thompson's OLED to make an active matrix light emitting display device of a structure known in the art such as the structure taught by Yamazaki et al. or Kamatani et al.

With respect to present claims 35 and 40, compounds suggested by Thompson et al. that are within the scope of organometallic complexes of present general formula 2 will inherently have the emission characteristics of those complexes.

5. Applicant's arguments filed June 15, 2006 have been fully considered but they are not persuasive with respect to the patentability of claims 1, 11, 17 and dependents over the prior art.

Applicant argues that Thompson et al. do not disclose or suggest that the place equal to R<sub>1</sub> of formula 2 is a phenyl group.

Applicant further argues that one of the objectives of the present invention is to provide white or whitish emission color by using a complex that emits both fluorescence and phosphorescence, but that Thompson et al. do not disclose this objective. Applicant points out that Thompson et al. teach that the phenylimine-containing complex of the formula in Thompson's paragraph [0172] is expected to be blue-shifted compared to Ir(ppy)<sub>3</sub>.

With respect to R<sub>1</sub> as a phenyl group, it is the examiner's position that one of ordinary skill in the art at the time of the invention would have at once envisaged a phenyl group as an aryl group.

With respect to the emission characteristics of the complex, the emission characteristics are inherent characteristics of the complex. Further with respect to the recitation in claims 38-40 of emission that is "white or whitish light color", and Thompson's teaching of blue-shifted emission, the claims do not limit the CIE coordinates of the emission. The only specific example of a complex within the scope of the rejected claims that is set forth in the specification is disclosed as providing "bluish white luminescence" (p. 20). If one looks at a color representation of a CIE diagram, one notes that there is not a clear demarcation between the region of CIE coordinates that appear white/whitish and the regions of CIE coordinates that provide other colors of light. (For example, see the color representation of a CIE diagram as found at < URL: <http://hyperphysics.phy-astr.gsu.edu/hbase/vision/cie.html>>.)



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6. Claims 23-32 are allowed.

Claims 36, 37, 41 and 42 will be allowable upon correction of the preamble of each of these claims.

7. Any inquiry concerning this communication should be directed to Marie R. Yamnitzky at telephone number (571) 272-1531. The examiner works a flexible schedule but can generally be reached at this number from 6:30 a.m. to 4:00 p.m. Monday, Tuesday, Thursday and Friday, and every other Wednesday from 6:30 a.m. to 3:00 p.m.

The current fax number for all official faxes is (571) 273-8300. (Unofficial faxes to be sent directly to examiner Yamnitzky can be sent to (571) 273-1531.)

MRY  
August 28, 2006



MARIE YAMNITZKY  
PRIMARY EXAMINER

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